

Financial Planning Perspectives

Is dilution the solution? Considerations for a concentrated equity portfolio

Investors may accumulate large allocations representing a substantial portion of their wealth to single-asset positions. These concentrated positions can be in public equity, real estate, or even private business; in this paper, we focus on public equity. Investors and advisors generally understand the risk of holding concentrated stock, but the known costs of liquidation and difficult-to-quantify benefits of diversification can create uncertainty about the best way to manage it. We analyze historical returns and use a quantitative framework to evaluate costs and benefits and conclude that, in most cases, the right approach is to diversify.

We suggest three points to guide decision-making about concentrated equity positions:

- Concentrated portfolios raise substantial concerns about idiosyncratic risk and portfolio diversification. A concentrated equity holding may increase your portfolio's risk and the probability that your returns will fall short of the broad market.
- The solution to holding concentrated positions of liquid securities in tax-advantaged accounts is clear: liquidate and diversify. But when tax and transaction costs are present, be sure to evaluate these costs against the benefits of diversification over the expected holding period.
- If immediate liquidation is not feasible, an array of options can help mitigate your risks. Their appropriateness will depend on your objectives, and their costs and benefits should be carefully assessed.

The challenges of concentration

Investors may hold concentrated stock positions for various reasons. These include the desire to participate in future returns, an interest in deferring capital gains, or even an emotional attachment to a particular investment. Some investors are compensated by their employers in the form of stock.

The exact definition of a concentrated position is subject to debate. Broadly speaking, whenever stock-specific volatility threatens your ability to meet financial goals or causes unnecessary anxiety over a portfolio, a concentration problem exists. While dependent on individual circumstances, 10% of a total equity portfolio allocated to a single position could be considered a reasonable threshold.¹ Several sizable holdings in a top-heavy portfolio could be equally damaging, however, especially if they share common sector, industry, or other characteristics that would imply close correlation.

A high degree of idiosyncratic risk can increase the volatility of a security's return.

A single-equity investment, whether held in a taxable or tax-advantaged account,² bears significant idiosyncratic (or company-specific) risk—risk that is unique to a particular stock itself, not related to the broad macroeconomic forces that govern returns of the equity asset class as a whole. A high degree of idiosyncratic risk can increase the volatility of a security's return.

Figure 1 displays the distribution of monthly rolling annual returns of individual S&P 500 Index stocks from 1985 through 2017 as well as the return distribution of the index itself. We see that the range of returns for the stock market as a whole is notably narrower than that of its individual constituents. Within a broad stock index, idiosyncratic risk is diversified away as the imperfect correlation of individual stock returns smooths the overall index return stream.³ Additionally, it is important to note that in 75% of monthly observations, the return of the market was greater than the median individual constituent return, with the average differential being 3.08%. Further, the range of returns in the bottom half of the distribution is wide. Losses from holding onto the wrong position could easily overwhelm any tax costs incurred from diversifying the risk.

Even if future average return expectations were assumed to be the same, the excess volatility experienced from an individual stock would be a drag on forward-looking returns from a wealth creation standpoint. An investment with the same arithmetic average return but with greater volatility would necessarily have a lower geometric average return. For example, an investment with a 20% return followed by a –10% return would generate a lower ending wealth than an investment with a 15% return followed by a –5% return. While both have an arithmetic average return of 10%, the wealth gain would be 8% in the first case versus 9.3% in the latter. As your time horizon increased, this volatility drag would be more pronounced.

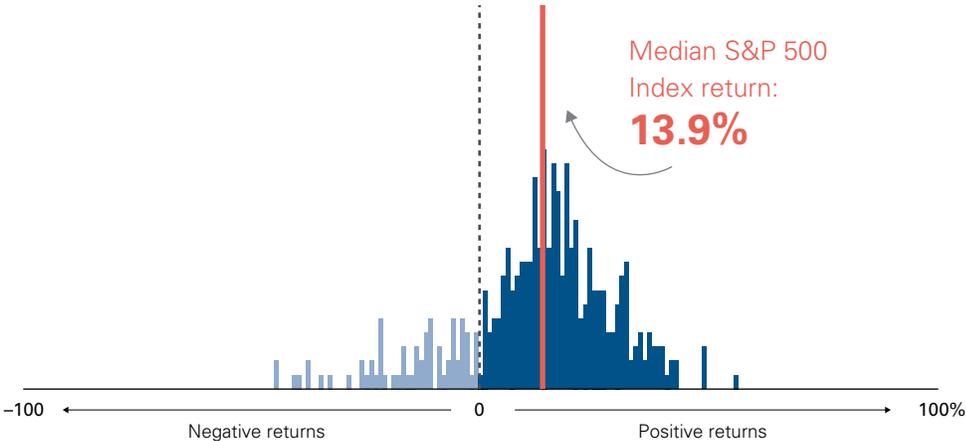
¹ This assumes, however, that the rest of the portfolio is adequately diversified.

² Our analysis is primarily concerned with concentrated positions in taxable accounts. For those held in tax-advantaged accounts such as IRAs, gains are deferred until withdrawn or avoided altogether. In these circumstances, pursuing additional portfolio diversification is always a prudent option.

³ The question of what defines a concentrated investment can be approached by asking to what extent adequate diversification can be achieved within an asset class or sub-asset class. Some researchers have argued that a well-diversified portfolio likely requires hundreds of securities (Statman, 2004). Broad-based equity indexes can contain thousands of securities. Although the number of stock holdings necessary to achieve reasonable diversification is subject to debate, it is fair to say that the greater the number of holdings, the more idiosyncratic risk is diversified away.

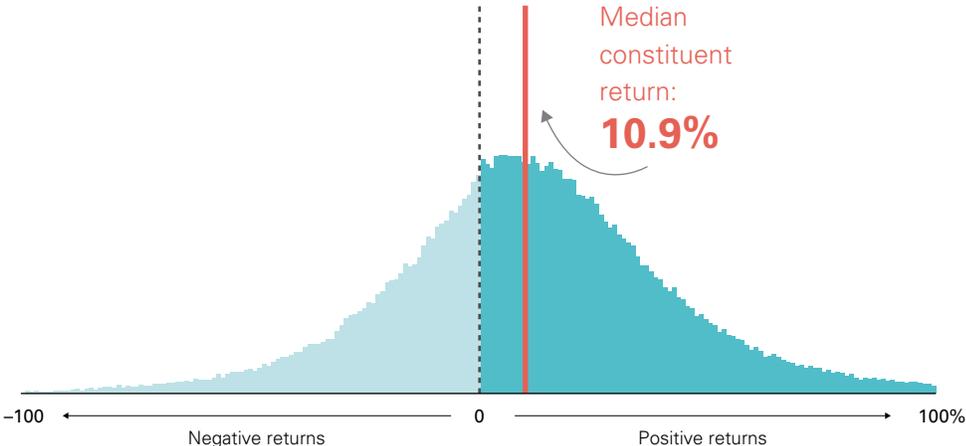
Figure 1. Owning individual securities carries significant idiosyncratic risk

Distribution of returns: S&P 500 Index



The range of returns for the stock market is narrower than that of its individual constituents.

Distribution of returns: individual stocks



Notes: The figure displays histograms of the count of monthly rolling annual return observations of the S&P 500 Index and its individual constituents from 1985 through 2017. Bin width is 1%; 2.1% of constituent returns were above 100% and are not shown.
Source: Vanguard calculations, using data from FactSet.

The trade-offs between costs and diversification

An investor may be reluctant to sell a concentrated position within a portfolio for several reasons, but a common one is the tax cost associated with realizing investment gains. The rate at which your capital gains are taxed will depend on a number of factors including the size of the gain, your income and state of residence, and how long you have held the position. A realized gain could be tax-free or it could be taxed at more than 30%.⁴ The reality for most will be somewhere in between. For less liquid securities, transaction costs could also be a factor, so it's important to determine the total estimated liquidation costs before making a decision.

The tension between a known tax cost and a difficult-to-quantify diversification benefit can lead many investors to inaction.

When tax liability is the chief concern, the known tax cost isn't always as large as it may seem at first blush. For example, consider an investor with a \$1,000,000 portfolio that contains a \$200,000 position with a \$100,000 cost basis. At a 20% capital gains rate, the sale of this position would generate a \$20,000 tax bill. That tax hit would represent a 10% cost relative to the concentrated position itself and a 2% cost relative to the total portfolio. From this perspective, a 2% "cost" to remove unnecessary risk from the portfolio may seem much more manageable.

While estimating the initial tax cost is relatively straightforward, it is more difficult to estimate the value of diversifying away single-stock risk. This tension between a known tax cost and a difficult-to-quantify diversification benefit (as highlighted in Figure 1) can lead many investors to inaction. **Figure 2** presents a few additional variables to consider when deciding how to manage a concentrated position and indicates how they may affect that decision.

Figure 2. Variables that affect the sell/hold decision



Note: All decision levers are considered in isolation, with all else equal.

Source: Vanguard.

⁴ In some cases, realized gains can also push an investor into a higher marginal income tax bracket.

Liquidation cost: A large tax or transaction cost can easily overwhelm any diversification benefit received by reducing or eliminating a concentrated position. The true tax cost will depend on whether you assume that taxes from the gains can be avoided altogether in the future (through a planned gift or basis step-up at death, for example) or merely deferred.⁵

Future time horizon: A longer investment horizon embeds (uncompensated) idiosyncratic risk into the portfolio for a greater period of time. All else being equal, selling down the position early will make many investors better off.

Risk tolerance: We all experience risk differently. Those with a higher risk tolerance may be more comfortable holding onto a concentrated equity position than those more sensitive to this risk. Though it can be difficult to measure risk sensitivity quantitatively, using risk-adjusted returns (see “Quantifying the trade-offs” on p. 6) provides one potential solution.

Risk to the portfolio: The risk to the portfolio will depend on the concentrated position’s size and level of return volatility. Without an expectation of additional return, lower risk is more desirable.

Several important factors to consider may be unique to each investor.

⁵ It is also important to consider how the investment relates to long-term planning objectives or other unique situations. For appreciated employer stock in a qualified plan, for example, an analysis of net unrealized appreciation (NUA) may be warranted. Generally, by taking advantage of this IRS provision, investors can transfer securities in-kind during a lump-sum distribution and owe a smaller amount of income tax based on the security’s market value. For more information, refer to IRS Publication 575.

A utility function is one way for investors to evaluate options by taking personalized assumptions into account.

Quantifying the trade-offs

For investors or advisors interested in a more quantitative approach to this decision, a utility function can incorporate various portfolio assumptions, including an investor's aversion to risk,⁶ into the calculation to produce a personalized risk-adjusted return. A risk-adjusted return associated with an all-equity portfolio including a concentrated position can be compared to the risk-adjusted return from liquidating the position and reinvesting the net proceeds in a diversified allocation over the relevant time horizon. The comparison can help the investor understand whether the risk reduction from selling a position will compensate for the initial loss from taxes and transaction costs.

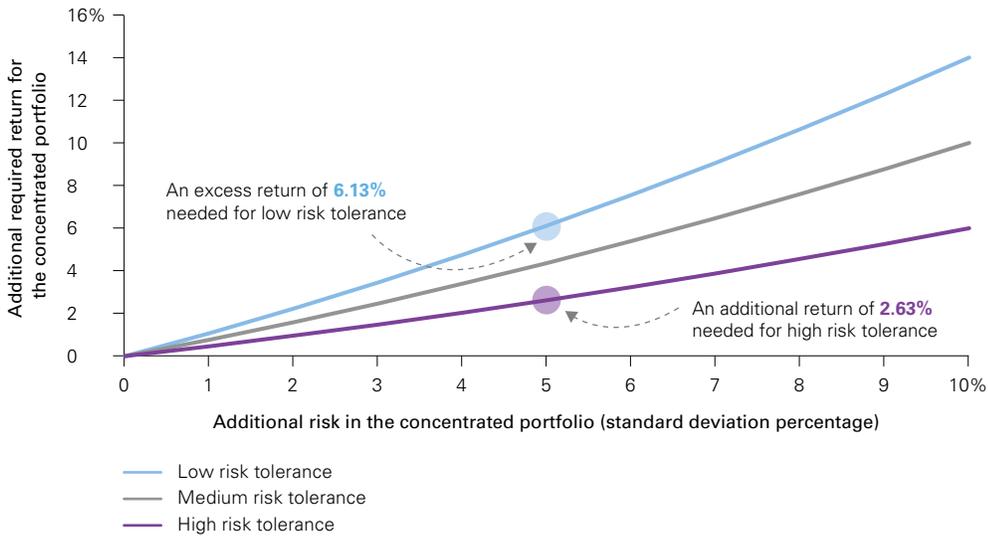
For our analysis, we use the following function:

Risk-adjusted return = Expected return of the portfolio – [0.5*(Risk tolerance estimate)*(portfolio standard deviation²)]

Figure 3 demonstrates the additional return needed to compensate an investor for a higher degree of risk. For example, if we assume that a diversified investment can produce a return of 10% and a standard deviation of 15%, a riskier portfolio with a standard deviation of 20% (+5) would need to generate an additional return of 2.63% to satisfy an investor with a high risk tolerance, or an excess return of 6.13% for an investor with a low tolerance.

⁶ In these types of calculations, risk tolerance is often measured as a "risk aversion parameter." A risk aversion parameter of zero would imply an indifference to risk and an assumption that the investor would always choose the investment option with the higher expected return. It is important to note that no one formal, agreed-upon range exists for this type of quantitative risk measure, though one through ten can be a reasonable scale.

Figure 3. Trading off risk and return



Investors can assess their tolerance for risk by asking how much return is necessary to justify additional volatility.

Notes: Base risk and return assumptions are 10% annualized return and an annualized standard deviation of 15%. We use parameters of seven, five, and three to denote low, medium, and high tolerance for risk.

Source: Vanguard calculations.

Case study

A more detailed application of a quantitative approach can be used to evaluate trade-offs between the costs of liquidation and the benefits of diversification.

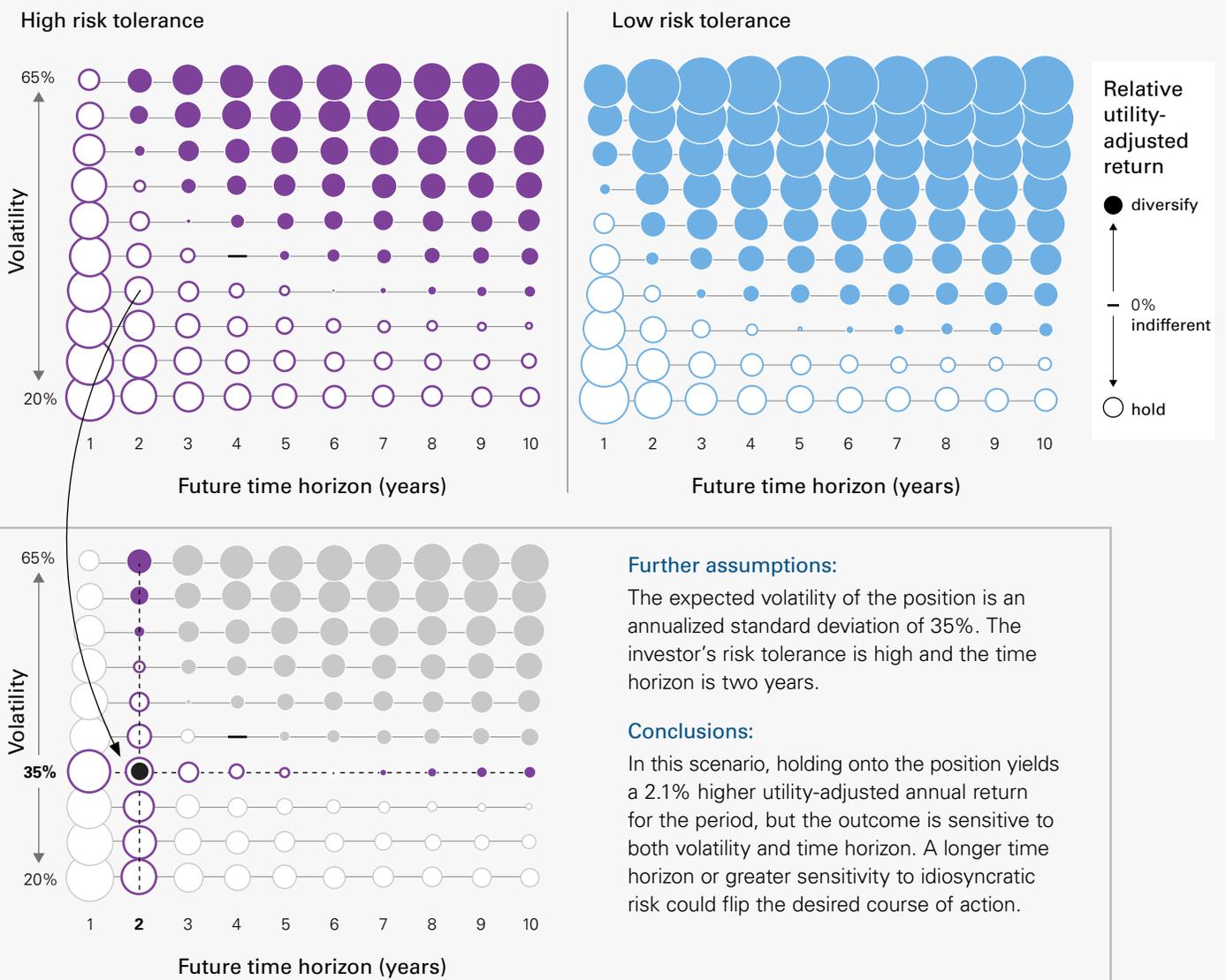
To illustrate how this could work under various assumptions, we look at a hypothetical position that makes up 25% of an investor's total portfolio with an embedded gain of 75%. The matrix in **Figure 4** (on the following pages) shows a comparison of utility-adjusted returns between two scenarios, one in which the concentrated position is held and one where the position is sold and diversified. We then vary assumptions of tax cost, time horizon, volatility, and risk tolerance to evaluate their effects and sensitivity. While this analysis presents a limited set of outcomes, most reasonable assumptions will lead the investor to sell and diversify a concentrated position unless the time horizon is relatively short and the liquidation costs are high now and can be avoided in the future (through, for example, a step-up in basis or planned charitable donation).

Figure 4. A risk-adjusted approach

Two hypothetical scenarios showing the relative benefit of liquidating a concentrated position to purchase a diversified investment after paying transaction costs versus holding onto the position are highlighted below. Both scenarios assume that the annual expected return is 10% for both the individual stock and the diversified investment and that the diversified investment has an annualized standard deviation of 15%.⁷ The circles represent the relative utility-adjusted return achieved from selling and diversifying the position. The solid circles represent scenarios where the benefits of diversification are expected to outweigh the transaction costs. Open circles represent scenarios where holding onto the position would be beneficial. The larger the circle, the stronger the case for action (or inaction).

Scenario 1 – High relative transaction costs

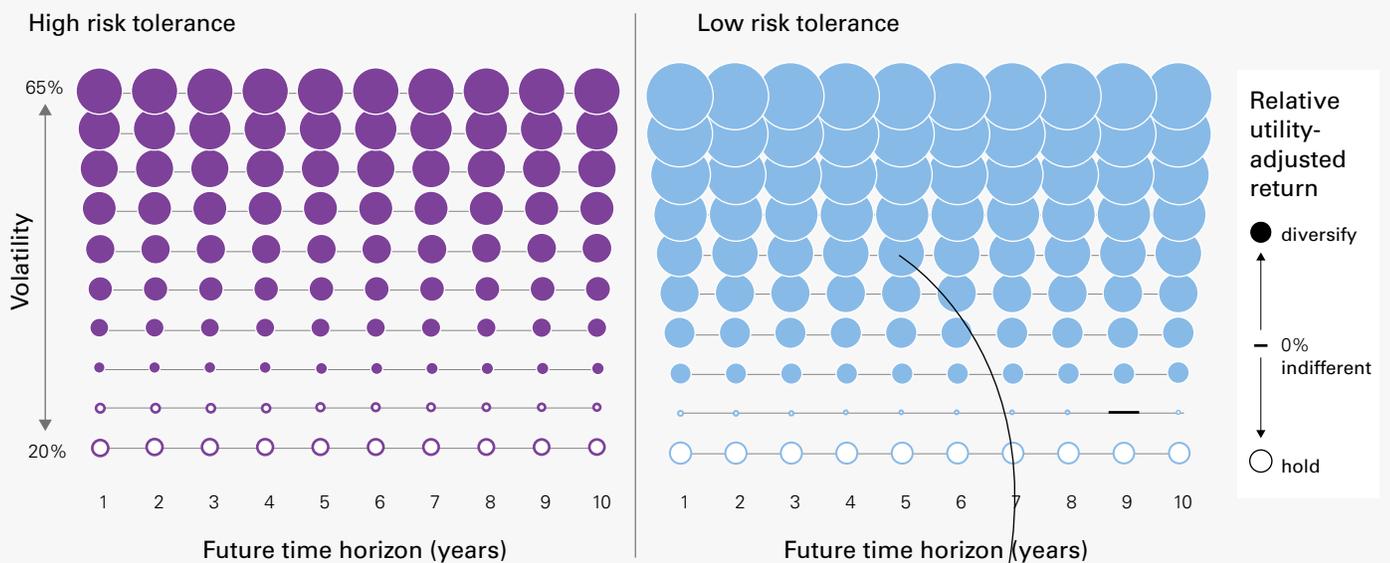
In this scenario, we assume an initial tax cost of 30% and a 0% tax rate in the future. This could be a planned charitable donation or an expected basis step-up at death. Below are the relative utility-adjusted returns for both high and low risk tolerance assumptions for varying degrees of volatility and time.



⁷ These risk/return assumptions could be altered depending on the investor's outlook. For example, it would be reasonable to use a lower return assumption for individual stock relative to a diversified equity investment to account for the volatility drag as discussed earlier.

Scenario 2 – Low relative transaction costs

In this scenario, we assume an initial tax rate of 15% that can only be deferred, subjecting the investor to the same capital gains tax of 15% at the end of the period. Below are the relative utility-adjusted returns for both high and low risk tolerance assumptions for varying degrees of volatility and time.

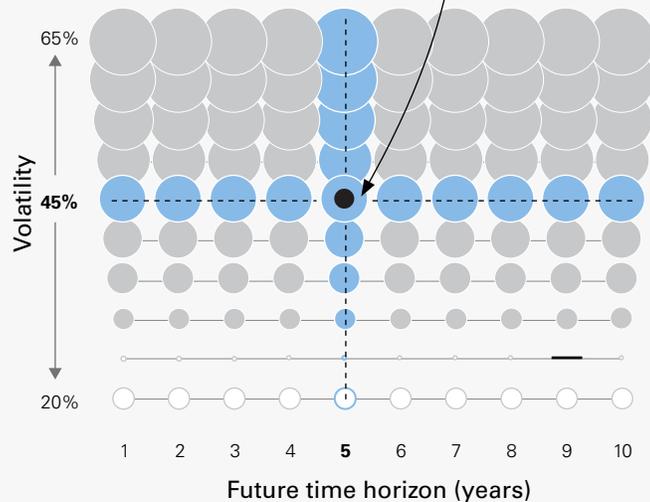


Further assumptions:

The expected volatility of the position is an annualized standard deviation of 45%, the tolerance for risk is low, and the investor has a time horizon of five years.

Conclusions:

In this scenario, liquidation is beneficial and results in a relative utility-adjusted return of 4.9% per year over the horizon. While expected volatility may affect the decision, time horizon matters less because the tax liability is simply being deferred to a later date. In this case, tolerance for risk affects the attractiveness of relative outcomes but doesn't materially alter the decision to sell or hold.



Notes: This hypothetical illustration does not represent the return on any particular investment and the rate is not guaranteed. Holding periods range from one to ten years in one-year increments. Expected volatility of the concentrated position ranges from a standard deviation of 20% to 65% in 5% increments. Market return and position return are both assumed to be 10%, and the correlation between the market and the individual position is assumed to be 0.46 (the average correlation of monthly returns of S&P 500 Index constituents to the index from 1985 through 2017). The low risk tolerance parameter is set at seven and the high risk tolerance parameter at three.

Source: Vanguard.

If immediate liquidation is not feasible, an array of options can help mitigate your risks.

Strategies to reduce concentration risk

As the previous section illustrates, it is generally advisable for most investors to liquidate concentrated positions as soon as feasible. However, we recognize that certain circumstances may push you to seek other options. **Figure 5** provides a brief summary of some common strategies.

This list does not include all available options. The optimal strategy will be investor-specific and depend upon factors including applicable tax laws, specific need for portfolio diversification, and desire to receive a short-term cash inflow. We encourage investors to consult with a financial advisor for additional information regarding the suitability of any particular strategy.

Figure 5. Options for improving portfolio diversification

Option	How to use	Comments
1. Make charitable gifts ⁸	Donating appreciated securities can be an effective way to avoid paying tax on securities with embedded capital gains while simultaneously contributing to a personally important cause or mission.	Reducing (or eliminating) the concentrated position can restore a more appropriate asset allocation balance to the portfolio immediately. Investors typically receive tax deductions from this strategy as well.
2. Liquidate over a period of years through strategic selling	Rather than liquidating immediately, doing so over a period of time can both improve diversification and spread capital gains tax out over the selling horizon. Investors can sell down in conjunction with other investment strategies including loss harvesting or tax lot identification to minimize the capital gains burden.	Bennyhoff (2007) found an additional annual benefit from deferring the capital gains tax bill over a three-year staged selling period. But staged selling fails to immediately eliminate a potentially large idiosyncratic risk exposure, which can certainly outweigh any marginal return improvement.
3. Hedge with derivatives	Call and put options or more exotic instruments such as prepaid variable forwards can be used to reduce downside risk or fully hedge a position. A fully hedged position can serve as collateral to monetize a concentrated equity position, and proceeds from the transaction can then be used to provide additional portfolio diversification.	The use of derivatives reduces the risk of holding a concentrated equity position without requiring an actual sale. But building a proper strategy can be complex and costly and involve important tax considerations. The costs of these hedging strategies could be factored into the framework described earlier.
4. Use cash flows to diversify	Inflows to and outflows from the portfolio can be used to diversify or rebalance. Using inflows to purchase a diversified investment will dilute the relative concentration of the position. Conversely, the position could be fully or partially liquidated through redemptions.	Cash flows can be an efficient means of reducing concentration risk, but their effectiveness can depend on the timing, frequency, and size of flows relative to the total portfolio.

⁸ For additional information, see Harbron and Shin (2017).

Conclusion

It's natural to look fondly upon stocks that have done well for a portfolio in the past. However, although some overweighting of favored positions may not be cause for concern, securities that grow to make an outsized contribution to portfolio risk should be curtailed. Our analysis suggests that deciding to hold a concentrated stock simply to avoid tax or other liquidation costs is rarely justified when it threatens to put long-term investment goals at risk. When deciding whether to hold, reduce, or sell a single position, you and your advisors should consider the portfolio's goals and the level of risk that you are able and willing to tolerate.

References

- Bennyhoff, Donald G, 2007. *Investment Solutions and Alternatives for Addressing Concentrated Equity*. Valley Forge, Pa.: The Vanguard Group.
- Harbron, Garrett, and Alisa Shin, 2017. *Charitable Giving: Three Steps for a Successful Plan*. Valley Forge, Pa.: The Vanguard Group.
- Statman, Meir, 2004. The Diversification Puzzle. *Financial Analysts Journal* 60 (4, July/Aug.): 44.

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